

# METHOD FOR PREPARING ULTRA-FINE, SUBMICRON GRAIN TITANIUM AND TI- TANIUM-ALLOY ARTICLES AND ARTI- CLES PREPARED THEREBY

## Abstract

A method for preparing ultra-fine, submicron grain titanium or titanium-alloy articles (78) used for joining or assembling of detail components. Coarse-grained titanium or titanium-alloy materials (52) are severely mechanically deformed using cryogenic milling into an ultra-fine, submicron grain powder, degassed and consolidated under controlled pressure and temperature. The resulting fasteners, articles, or components manufactured from such material have improved material performance characteristics associated with this ultra-fine, submicron grain material structure.